

The diurnal cycle of precipitation over South America and how preceding soil moisture conditions can affect precipitation events.

Poster Summary

In this poster, we analyzed the diurnal cycle of precipitation from October to March over South America according to RCA4 regional climate model and compared it to two 3 hourly satellite based products: TRMM 3B42 V7 and CMORPH V1.0. We then explored the existence of a relationship between afternoon precipitation events and preceding soil moisture conditions.

We looked at the differences in frequency and amount of precipitation between nighttime and daytime hours and found: (i) more frequent daytime precipitation over most of the continent in RCA4 data which is consistent with the satellite products, except for a region over northern Argentina where the products disagree. This region is known for the presence of MCSs that the model fails to reproduce. Still, there are big quantitative differences between the three cases. (ii) Higher amounts of daytime (nighttime) precipitation over western Brazil (northeastern Argentina), with many discrepancies in other regions.

An EOF decomposition from 3 hourly climatology shows two main modes of variability. We attribute the first one to the afternoon convection development, with a maximum at 18 UTC, in good agreement with satellite products, and a second mode with a secondary maximum attributed to coastal and orographic forcings.

Finally we adapted the coupling metrics from *Guillod et al. (2015) 'Reconciling spatial and temporal soil moisture effects on afternoon rainfall'* to the resolution of RCA4 data and found that afternoon precipitation events in the model tend to occur over drier soil patches than its surroundings and where soil conditions are more heterogeneous. Temporarily, we found a preference for drier (wetter) soil conditions than the monthly mean over the west (east).